

# Revisiting Gass Macular Hole Grading

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## ABSTRACT

Macular hole is an ophthalmological condition that can leave the eye totally blind if not treated properly. It starts with a small splitting within the macular area. A macular break through can develop with loss of neural retina. Fluid subsequently collect making correction of the condition a time sensitive matter.

**Key words:** Cyst, detachment, distortion, fluid, hole, intraretinal, macula, posterior vitreous detachment, retinal, subretinal

## INTRODUCTION

The macula is a common location for symptomatic retinal problems. Commonly, posterior vitreous detachment (PVD) initiates the macular symptoms. Idiopathic macular hole is a symptomatic retinal pathology affecting nearly 7.8/100,000 population favoring more women with a ratio of 3.321:1 females:males.<sup>[1]</sup> The disease is bilateral in 12–13% in 2 years after presentation.<sup>[2]</sup>

## SYMPTOMS

Common features of symptomatic macular holes are decreased visual acuity, metamorphopsia, and central scotomas.

## DISCUSSION

### Grading, presentation, and natural history

Watzke and Allen<sup>[3]</sup> devised a test to examine for macular holes. Thinking now about this ingenious test, it had used the principles of optical coherence tomography (OCT) even before OCT was ever known. Their test utilized the distortion caused the displacement of photoreceptors along the perimeter of the hole and later lack of junction of those photoreceptors. By shining a line of light mostly vertically over the macular hole, a small waist or dehiscence can appear in the line of light.

In the pre era, Gass<sup>[4]</sup> devised a grading system for macular holes based on biomicroscopic findings. This system is still widely used in clinics and literature. It is also useful in predicting the visual outcome of surgical interference for macular holes.

In the OCT era, new findings can be deduced from scanning the retina. With the availability of OCT to almost all major eye units at least; in Western countries, OCT features of macular holes can be used in conjunction to the original Gass grading system. We are now aware of the term occult PVD which means that posterior hyaloid is detached from the fovea but still attached to the optic disc.

## GASS GRADING SYSTEM

### Stage 0

Consists of partial posterior vitreous attachment where the vitreous is still attached to the fovea while separated at the disc when the contralateral eye has full thickness macular hole.

### Stage 1

Impending macular hole: Biomicroscopically, it appears as a foveal spot 1A<sup>[5]</sup> or ring 1B.<sup>[6]</sup> On OCT, it appears as an intraretinal cyst. Typically, at this stage there is no distortion. Patient is usually asymptomatic or aware of a grey patch in their central vision. Such a macular hole has a 50% chance for self-resolution mostly with development of Posterior Vitreous Detachment (PVD).<sup>[7]</sup> Progression to Full thickness macular hole (FTMH) occurs in 40%.<sup>[8]</sup>

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**Stage 2**

Clinically, a small crescent or round hole <400 appears. Distortion is a feature of this stage of macular hole. It progresses to Stage 3 or 4 within 12 months in 74%.<sup>[9]</sup> Occult PVD, as we know it now, occurs in 74%.<sup>[10]</sup> Spontaneous closure occurs in 11.5%.<sup>[11]</sup> If left untreated, they have a 75% chance of eyesight drop in 6/60 after 5 years duration.<sup>[12]</sup>

**Stage 3**

Consists of a large round whole of more than 400  $\mu\text{m}$ . Symptoms can be in the form of distortion and/or a central scotoma. Occult PVD is present in 74%. Spontaneous closure occurs in only 4%.<sup>[13]</sup>

**Stage 4**

Any hole size or shape associated with PVD. The patient usually complains of central scotoma. OCT can show complete separation of posterior vitreous and occasionally an operculum floating over the hole.

In FTMH, Grades 2–4, variable amounts of intraretinal and subretinal fluid can appear around the hole. The edge of the hole can appear elevated either due to persistent vitreal traction or the intraretinal fluid.

## NEW INTERNATIONAL CLASSIFICATION

International Vitreomacular Traction Study Group<sup>[14]</sup> introduced a new classification suitable for the age when OCT is readily available to ophthalmologists. This classification is important because it determines the management and prognosis of macular holes based on the cause, size, and presence of vitreomacular traction. This OCT-based classification first divides macular hole into primary or secondary depending on whether caused by vitreomacular traction (primary) or some other reason (secondary). Then, a further division is made on the basis of the minimum width of the hole; small, under 250  $\mu\text{m}$ ; medium, 250–400  $\mu\text{m}$ ; and large, larger than 400  $\mu\text{m}$  in minimum width. The last layer of subclassification depends on whether vitreomacular tractions still exist or not.

## CONCLUSION

Macular hole is a condition that has been diagnosed and treated based on biomicroscopical findings for a long time before the introduction of OCT into ophthalmology. OCT has revolutionized diagnosis and management of the condition. It also predicted the prognosis. Postoperatively, OCT scanning allowed the detection of closure of the hole whether additional time was needed for posturing. In general, ophthalmologists understanding of natural history of macular holes have improved dramatically with the use of OCT scanning.

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